

New US Patent Application filed September 29, 2006  
Preliminary Amendment

Amendments to the Claims

This listing of claims will replace all prior versions and listings of the claims in the application:

Listing of Claims

~~Patent claims~~  
Claims

1. (Currently Amended) A control ~~Control~~ circuit for relay-operated gas valves, with a relay ~~(11)~~ for opening and/or closing a gas valve and with a failsafe circuit ~~(12)~~ for the relay ~~(11)~~, a control device being connectable to an ~~one~~ input ~~(13)~~ of the failsafe circuit ~~(12)~~, and the failsafe circuit ~~(12)~~ only supplying the relay ~~(11)~~ with a voltage and/or current necessary for opening the gas valve when an input signal having at least two different frequency signals succeeding each other in time is supplied at the ~~an~~ input ~~(13)~~ of the failsafe circuit ~~(12)~~ by the control device.

2. (Currently Amended) The control ~~Control~~ circuit ~~as claimed in~~ of claim 1, wherein ~~characterized in that~~ the failsafe circuit ~~(12)~~ includes a charging circuit ~~(14)~~, the charging circuit ~~(14)~~ having at least one capacitor ~~(16)~~, and the charging circuit ~~(14)~~ charging at least one of the at least one capacitors ~~(16)~~ of the charging circuit ~~(14)~~ upon the application or presence of a first frequency signal in the input signal.

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3. (Currently Amended) The control ~~Control~~ circuit ~~as claimed~~  
~~in~~ of claim 2, wherein ~~characterized in that~~ the charging  
circuit ~~(14)~~ charges the at least one of the one or more  
capacitor ~~(16)~~ ~~or each capacitor (16)~~ of the charging circuit  
~~same~~ exclusively upon the presence of the first frequency signal  
in the input signal.

4. (Currently Amended) The control ~~Control~~ circuit of claim 2 as  
~~claimed in claim 2 or 3, wherein~~ ~~characterized in that~~ the  
charging circuit ~~(14)~~, upon the application or presence of a  
second frequency signal in the input signal, the second  
frequency signal having a lower frequency than the first  
frequency signal, does not charge the at least one of the one or  
more capacitor ~~(16)~~ ~~or capacitors (16)~~ of the charging circuit.

5. (Currently Amended) The control ~~Control~~ circuit of claim 2 as  
~~claimed in one or more of claims 2 to 4, wherein~~ ~~characterized~~  
~~in that,~~ upon the application or presence of a second frequency  
signal in the input signal, the second frequency signal having a  
lower frequency than the first frequency signal, the at least  
one of the one or more capacitor ~~(16)~~ ~~or each capacitor (16)~~ of  
the charging circuit ~~(14)~~ discharges.

6. (Currently Amended) The control ~~Control~~ circuit of claim 5 as  
~~claimed in one or more of claims 1 to 5, wherein~~ ~~characterized~~  
~~in that~~ the failsafe circuit ~~(12)~~ includes a drive circuit ~~(15)~~  
~~for~~ coupled to the relay ~~(11)~~, the drive circuit ~~(15)~~, upon the  
application or presence of a ~~the~~ second frequency signal in the

input signal, supplying the relay ~~(11)~~ with a voltage and/or  
current necessary for opening the gas valve.

7. (Currently Amended) The control ~~Control of as claimed in~~  
claim 6, wherein ~~characterized in that~~ the drive circuit ~~(15)~~  
has at least two transistors ~~(24, 25)~~, a base of a first  
transistor ~~(24)~~ being connected via a resistor ~~(26)~~ to a  
capacitor ~~(16)~~ of the charging circuit ~~(14)~~, and the first  
transistor ~~(24)~~ of the drive circuit ~~(15)~~ only conducting when  
the capacitor ~~(16)~~ of the charging circuit ~~(14)~~ discharges  
itself upon the application of the second frequency signal in  
the input signal.

8. (Currently Amended) The control ~~Control circuit of as claimed~~  
~~in claim 7,~~ wherein ~~characterized in that~~ a collector of the  
first transistor ~~(24)~~ is connected via an interposed resistor  
~~(24)~~ to a supply voltage ~~(V)~~, and that an emitter of the first  
transistor ~~(24)~~ is connected to a ground potential.

9. (Currently Amended) The control ~~Control circuit of as claimed~~  
~~in claim 7 or 8,~~ wherein ~~characterized in that~~ a second  
transistor ~~(25)~~ is switched with the first transistor ~~(24)~~ in  
such a manner that a collector of the second transistor ~~(25)~~ is  
connected to the base of the first transistor ~~(24)~~ and an  
emitter of the second transistor ~~(25)~~ is connected to a ground  
potential.

10. (Currently Amended) The control ~~Control circuit of as~~  
~~claimed in claim 9,~~ wherein ~~characterized in that~~ a base of the

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second transistor ~~(25)~~ is coupled via ~~switched over~~ an interposed resistor (28) with the input (13) of the failsafe circuit (12).

11. (Currently Amended) The control ~~Control~~ circuit of claim 6 as ~~claimed in one or more of claims 6 to 10, wherein~~ characterized ~~in that the drive failsafe circuit (15) for the relay (11)~~ further in each case has ~~includes~~ two Darlington transistor circuits ~~(29, 30)~~, a diode ~~(34)~~ connected in parallel to the relay ~~(11)~~ and, making contact between the two Darlington transistor circuits ~~(29, 30)~~, a series connection of a resistor ~~(32)~~ and a capacitor ~~(33)~~.

12. (Currently Amended) The control ~~Control~~ circuit of claim 1 ~~as claimed in one or more of claims 1 to 11, wherein the at~~ least two different frequency signals include a first frequency signal and a second frequency signal, and wherein ~~characterized in that the first frequency signal has a frequency of around 1000 kHz and the second frequency signal has a frequency of around 5 kHz, the two frequency signals being applied in the input signal succeeding one another in time in such a manner that in each case a time span of around 40 ms with the first frequency signal of around 1000 kHz is followed by a time span of around 80 ms with the second frequency signal of around 5 kHz.~~

13. (Currently Amended) The control ~~Control~~ circuit of claim 1 ~~as claimed in one or more of claims 1 to 12, wherein~~ characterized in that it the failsafe circuit only supplies the

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relay with a voltage and/or current necessary for opening the gas valve if the two different frequency signals are applied succeeding each other in time by definition in the input signal.

14. (New) The control circuit of claim 1, wherein the at least two different frequency signals include a first frequency signal and a second frequency signal, and wherein the first frequency signal and the second frequency signal are applied successively in the input signal in such a way that a first time period with the first frequency signal is respectively followed by a second time period with the second frequency signal.

15. (New) A fail-safe circuit for controlling a relay that controls the opening of a gas valve, the fail-safe circuit comprising:

at least one input that can be connected to a gas valve controller;

at least one output that can be connected to the relay; and  
the fail-safe circuit configured to only supply an output signal to the relay to open the gas valve via the at least one output of the fail safe circuit if/when the gas valve controller provides an input signal having at least two different frequency signals to the at least one input of the fail-safe circuit.

16. (New) The fail-safe circuit of claim 15 wherein the fail-safe circuit is configured to only supply an output signal to the relay to open the gas valve via the at least one output of the fail safe circuit when the gas valve controller provides an

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input signal that includes a first frequency signal that is coordinated in time with a second frequency signal.

17. (New) The fail-safe circuit of claim 15 wherein the fail-safe circuit is configured to only supply an output signal to the relay to open the gas valve via the at least one output of the fail safe circuit if/when the gas valve controller provides an input signal that includes a first frequency signal for a first period of time followed by a second frequency signal for a second period of time.

18. (New) The fail-safe circuit of claim 17 wherein the fail-safe circuit is configured to only supply an output signal to the relay to open the gas valve via the at least one output of the fail safe circuit if/when the first frequency signal is not supplied during the second period of time, and the second frequency signal is not supplied during the first period of time.

19. (New) A method for controlling a relay that controls the opening of a gas valve, the method comprising the steps of:

determining if a gas valve controller is currently providing a valid gas valve control signal;

providing a signal to the relay in accordance with the gas valve control signal if the determining step determines that the gas valve controller is currently providing a valid gas valve control signal; and

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closing the gas valve via the relay if the determining step determines that the gas valve controller is not currently providing a valid gas valve control signal.

20. (New) The method of claim 19 wherein the determining step includes determining if the gas valve controller is providing an input signal that includes a first frequency signal for a first period of time followed by a second frequency signal for a second period of time.

21. (New) The method of claim 20 further comprising the steps of:

charging a capacitor of a charging circuit during the first period of time when the input signal includes the first frequency signal; and

charging a capacitor of a drive circuit during the second period of time when the input signal includes the second frequency signal, wherein a charged voltage across the capacitor of the driving circuit provides a current to the relay to maintain the relay in its current state when the capacitor of the charging circuit is charging.